

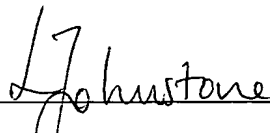
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UNITED STATES PATENT AND TRADEMARK OFFICE

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1. That I am a citizen of the United Kingdom of Great Britain and Northern Ireland.
2. That I am well acquainted with the German and English languages.
3. That the attached is, to the best of my knowledge and belief, a true translation into the English language of the accompanying copy of the Amendments to the specification filed with the application for a patent in Germany on 9 September 2003 under the number PCT/DE2003/002991 and the official certificate is attached hereto.
4. That I believe that all statements made herein of my own knowledge are true and that all statements made on information and belief are true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the patent application in the United States of America or any patent issuing thereon.

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For and on behalf of Siemens Shared Services/
Siemens Translation Services

The 17 day of March, 2005

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Description

Method for mounting a switching module, switching module and pressure strip

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The invention relates to a method for mounting a switching module, in which a circuit support is inserted into a basic housing element and the basic housing element is closed with the aid of cover elements.

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The invention also relates to a switching module with an electronic component.

Electronic components have to be protected from environments that are subject to dirt and vibration. Therefore special housings are developed to accommodate printed circuit boards for electronic transmission controllers, the dimensions and structure of said housings being tailored to the printed circuit boards used in each instance. Known housings only bear a very slight mechanical similarity to each other. Also a specific, new set of tools is required to produce base plates, covers, plug connectors and further fixing elements for each type of housing.

However there is a demand for housings that are economical to produce and simple to mount and are suitable for accommodating an electronic control system arranged outside the transmission. These housings may be sealed or unsealed. The structure of the device and the mounting process should be achieved with the smallest possible number of components and work and process steps. It should also be possible to tailor the housings easily to different printed circuit board

dimensions, without leaving unused empty space inside the housing.

A housing for an electronic circuit is known from the
5 publication US 5,272,593, into which a cooling frame can be
inserted with a printed circuit board fixed thereto. Leaf
springs are thereby fixed to the cooling frame, which are
braced against studs on the housing and cause the cooling
frame to exert a strong pressure on the housing wall.

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Based on this prior art, the object of the invention is
therefore to create a simple and economical method for
mounting a switching module.

15 These objects are achieved by the method and the switching
module with the features set out in the independent claims.
Advantageous embodiments and developments are set out in the
dependent claims.

20 To produce a housing, the basic housing element is preferably
produced by separating a hollow profile and closing the
openings on the transverse sides of the basic housing elements
with the cover elements.

25 As the basic housing element is produced by separating a
hollow profile, the length of the basic housing element can be
varied to an almost infinite degree. It is therefore possible
to produce basic housing elements of different lengths from
one hollow profile, which can be fitted with circuit supports
30 of different lengths. The length of the basic housing element
can particularly be selected such that there is no empty
volume within the housing.

AMENDED SHEET

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The hollow profile is preferably extrusion molded. This allows the sectional profile to be configured in a simple fashion such that a circuit support can be fixed inside the housing without further fixing means. It is thus possible for example
5 to provide recesses extending along the longitudinal axis of the hollow profile, into which self-tapping screws can be screwed to fix the cover elements. Also bearing surfaces can be provided for the circuit support in the sectional profile, which are arranged such that a circuit support with components
10 fitted on both sides can be inserted into the basic housing element.

AMENDED SHEET

Claims

1. Method for mounting a switching module, in which a circuit support (1, 42) is inserted into the basic housing element (10, 35, 44) with its flat sides (63, 64) facing walls (20, 21, 46, 53) of a basic housing element (10, 35, 44) and the basic housing element (10, 35, 44) is closed with the aid of cover elements (6, 25, 37, 47, 52), characterized in that
- 10 a longitudinally extended pressure strip (26, 49) is inserted between the circuit support (1, 42) and the basic housing element (10, 35, 44), by means of which a compression force acting on a flat side (64) of the circuit support (1, 42) is applied and that the pressure strip (26, 49) is guided by
- 15 guide means (17, 18, 19, 50) configured on the inside of the basic housing element (10, 44).
2. Method according to Claim 1, characterized in that the pressure strip (26, 49) configured
- 20 as a tension spring is charged during insertion of the circuit support (1, 42) and released to fix the circuit support (1, 42) in the basic housing element (10, 44).
3. Method according to Claim 1, characterized in that the pressure strip (26, 49) configured
- 25 as a compression spring for fixing the printed circuit board (1, 42) is subject to a pressure (57) that compresses the compression spring.
- 30 4. Method according to Claim 3, characterized in that the pressure (57) is applied by the cover elements (47, 52) of the basic housing element (44)

5. Method according to one of Claims 1 to 4,
characterized in that the pressure strip (26, 49) is guided
inside the basic housing element (10, 44) by an encapsulated
5 guide groove (17, 50).

6. Method according to one of Claims 1 to 5,
characterized in that the circuit support (1, 42) is guided by
guide elements (16, 18, 19, 36, 45) during insertion into the
10 basic housing element (10, 35, 44).

7. Method according to Claim 6,
characterized in that the circuit support (1, 42) is fitted
with components on both sides before insertion into the basic
15 housing element (10, 35, 44).

8. Method according to one of Claims 1 to 7,
characterized in that a cover element (6, 47) is fixed to the
circuit support (1, 42) before insertion of the circuit
20 support (1, 42) into the basic housing element (10, 35, 44).

9. Method according to Claim 8,
characterized in that contact means (5, 7, 48) configured on
the cover element (6, 47) are connected to the circuit support
25 (1, 42) before insertion of the circuit support (1, 42) into
the basic housing element (10, 35, 44).

10. Method according to one of Claims 1 to 9,
characterized in that the pressure strip (26, 49) is inserted
30 into the basic housing element (10, 35, 44) together with the
circuit support (1, 42)).

11. Method according to one of Claims 1 to 10,
characterized in that a cover element (25, 47) provided with
the pressure strip (26, 49) is attached to an opening (15, 43)
5 in the basic housing element (10, 35, 44).

12. Method according to one of Claims 1 to 11,
characterized in that the pressure strip (26) is tailored to
the length of the basic housing element (10) at breaking
10 points (34) before insertion into the basic housing element
(10).

13. Method according to one of Claims 1 to 12,
characterized in that the pressure strip (26) is held
15 positively in a recess (33) in an opposite cover element (6).

14. Method according to one of Claims 1 to 13,
characterized in that a saw-tooth profile (32) is configured
on the pressure strip (26) and is held positively in latch
20 points on the recess (33).

15. Method according to Claim 13 or 14,
characterized in that the basic housing element (10, 35) is
clamped between opposite cover elements (6, 25, 37).

25 16. Method according to one of Claims 1 to 15,
characterized in that a cover element (37) is fixed to the
circuit support (1) by way of clamping means (39, 40) during
attachment of a cover element (37) to an opening (15) in the

basic housing element (35).

17. Method according to one of Claims 1 to 16,
characterized in that the openings (12, 15) on the transverse
5 sides (11, 14) of the basic housing element (10, 35) are
sealed by means of identical seals (24, 30).

18. Switching module with an electronic component arranged
inside a housing,
10 characterized in that the switching module can be produced
using a method according to at least one of Claims 1 to 17.